

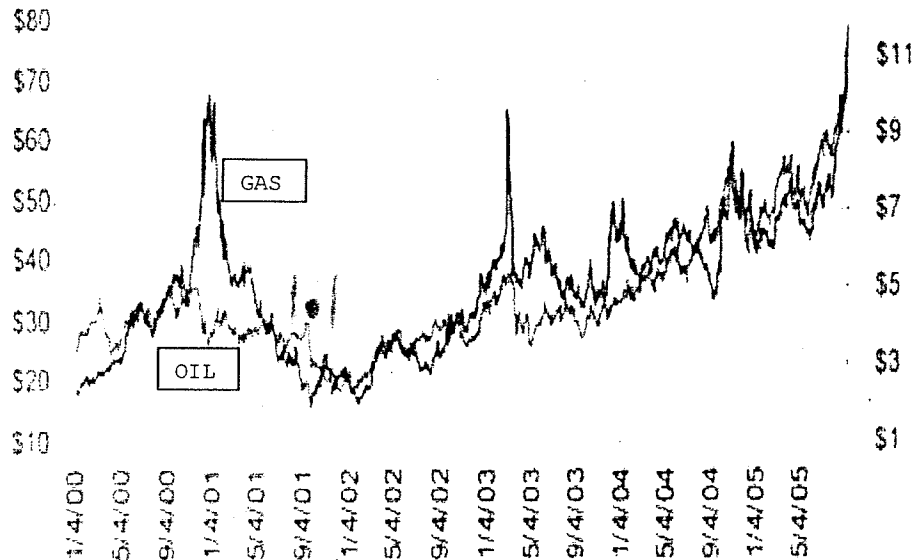
IV. UNCERTAINTIES ABOUT THE FUNCTIONING OF NATURAL GAS MARKETS

A. VOLATILITY, RISK PREMIUMS AND EFFICIENCY

The potential impact of volatility and risk on prices is a major concern in energy commodity markets. Volatility and risk premiums are substantial and have been increasing over time.¹ In an analysis whose data ends in 2002, Pyndyck concludes that the Enron scandal added a “marginally significant” 1.5 percent to an average volatility of 20 percent. He concludes that the increase “has little economic importance.”² The peak volatility for the July 2000 to July 2002 period in Pyndyck’s analysis occurred on September 26, 2001, at the height of the Enron troubles. Be that as it may, the change since has been dramatic (see Exhibit IV-1). After the quiet period of 2002, volatility increased in 2003 and both prices and volatility have increased since. The economic significance is much greater.

EXHIBIT IV-1: NATURAL GAS PRICE VOLATILITY: SINCE THE TURN OF THE CENTURY

Natural Gas Volatility = 62% Crude Oil Volatility = 39%



Source: Servnek, Matthew, “What You Need to Know Before Investing in Energy.” *The*

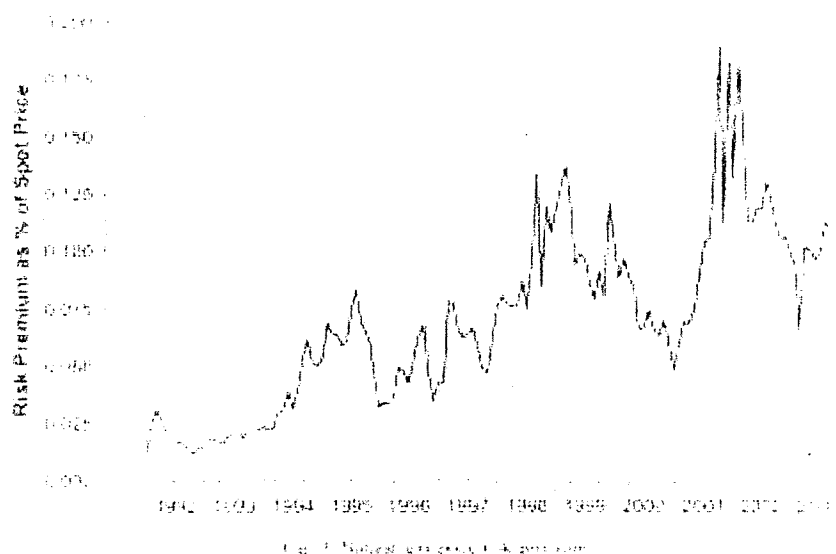
The risk premium analysis parallels the price analysis described earlier in that the advent of Enron trading saw a sharp jump over a long-term upward trend, then a reduction with the demise of Enron (see Exhibit IV-2).³ Unfortunately, the analysis did not include data for 2004 and 2005.

The estimated risk premium seems to be positive throughout the sample period and the average value of the risk premium appears to be economically significant, ranging from 3% to 11% of spot prices. The hypothesis of zero mean risk can be rejected at high significance levels for all the sample periods. The risk premium appears to be increasing over time especially towards the end of the period [2000-2003].⁴

Bias could be interpreted as the risk premium required by the market participants for bearing the systematic risk of natural gas price movements.⁵

This bias reaches about 10% per year. A speculator would earn this rate of return on average going long in the natural-gas futures. Such speculation would of course be quite risky judging from the size of the error variances.⁶

EXHIBIT IV-2: THE NATURAL GAS MARKET RISK PREMIUM



Source: Song Zan, Chiou Wei, and Zhen Zhu, "Commodity Convenience Yield and Risk Premium Determination: The Case of the U.S. Natural Gas Market," *Energy Economics*, forthcoming.

The finding of a “bias” in the natural gas market can be related to structural factors that work to the detriment of consumers since, “for regulatory reasons the buyers that are comprised of power producers as well as electricity and natural gas distribution companies may not have enough incentives to hedge their risk.”⁷ Friction in the market may also affect the pattern of prices since “due to locational basis risk, the buyer’s incentives to hedge price risk may be dulled.”

Market participants with rational expectations predict the direction of spot prices most of the time, but require a risk premium to take a position. For example, a buyer might correctly expect the spot price to decrease at Henry Hub. However, due to uncertainty about transportation conditions the buyer might still require a risk premium in buying futures. Similarly, the fact that a producer expects prices to go up does not mean that s/he would be willing to sell futures at the expected future spot price.⁸

In theory, spot commodity prices should track futures prices reasonably closely in properly functioning markets, particularly as the date for the settlement of the future contract approaches.⁹ Futures prices should reflect market fundamentals, above all the cost of producing the commodity, since high futures prices should elicit more supply that drives prices down.

In practice, recent U.S. government reports demonstrate that this is not the case in the natural gas market. Natural gas prices simply do not track with futures prices properly and the disconnect has been growing. The disconnect tracks on the high side – to the expense of consumers and the benefit of producers and traders – and it has been widening.

A report from the U. S. Energy Information Administration (EIA) concluded that “prices of natural gas futures contracts expiring during the past three heating seasons (2002-2003, 2003-2004, 2004-2005) generally did not perform well as a predictor of realized spot prices at the Henry Hub.”¹⁰

While spot prices are a poor predictor of futures prices, the Henry Hub spot prices are a very good predictor of the wellhead price of gas. Thus, there is a disconnect between futures prices and wellhead prices. The disconnect is important because of the role these futures prices play.

However, as an indication of market expectations concerning prices in the future, some industry and market participants tend to use the prices for futures contracts as predictions of commodity prices that will be realized in subsequent months, although NYMEX itself does not explicitly encourage this view...

Comparing monthly futures and spot market prices allows an examination of current market conditions on price expectations and provides a basis to assess the performance of futures prices as a predictor of spot prices.

The price movement patterns for the 2004-2005 heating season contracts differ from those for the 2002-03 and 2003-04 heating season contracts, as the futures diverged from the Henry Hub spot price. This is further evidenced by the lower correlation coefficients...¹¹

Industry analysts have also come to question the role of the Henry Hub price.

Cambridge Energy Research Associates, in a report issued to clients Sept. 23, said Henry Hub, despite its key role in the delivery point for the NYMEX gas futures contract and the reference point for basis deals and various other physical and financial trades, "is increasingly an imperfect indicator of the average price that North American producers receive..."

CERA found that the average price at Henry Hub is increasingly higher than the price received by North American gas producers. In 2000, the Henry Hub price average 18 cents/MMBtu above the production-weighted average supply price; for the 12 months ending August, that premium had grown to 50 cents/MMBtu, according to the report.¹²

Similarly, a report from Lawrence Berkeley National Laboratory (LBL) concludes that futures prices are far above projections of the cost of production.¹³

As was the case in the past five *AEO (Annual Energy Outlooks)*, we once again find that the *AEO 2006* reference case gas price forecast falls well below where NYMEX natural gas futures contracts were trading at the time the EIA finalized its gas price forecast."¹⁴

It is important to note that when LBL began analyzing the disconnect between the EIA numbers and the NYMEX numbers, the EIA "characterized their efforts as *projecting* natural gas *costs* rather than *forecasting* natural gas prices."¹⁵ Future prices do not have to perfectly track production costs, but when the disconnect becomes large there is cause for concern. The EIA projection for December 2005 showed a very substantial disconnect.

In fact, the NYMEX-*AOE 2006* reference case comparison yields by far the largest premium — \$2.3/MMBtu levelized over five years — that we have seen over the last six years. In other words, on average, one would have to pay \$2.3/MMBtu *more* than the *AEO 2006* reference case natural gas price forecast in order to lock in natural gas prices over the coming five years.¹⁶

The premium is a huge number, equal to more than one third of the estimated cost of production. It amounts to almost \$48 billion on an annualized basis, or about \$4 billion per month. For a household heating with natural gas in the Midwest, it would add about \$200 dollars to this winter's heating bill. Moreover, this figure is levelized over five years. The current and near term disparity is even larger than that, perhaps over \$5.00/MMBtu. As pointed out earlier, it accounts for a large part of the increase in natural gas prices since 2002.

These figures alone are enough to command the attention of policymakers and the public. But the fact that the disconnect between costs and prices is not an anomaly makes it even more troubling.

Most commodity market analysts are unwilling to question the workings of these markets, except in the most extreme examples of market manipulation – blatant attempts to corner the market or fraudulent reporting of prices. Thus, after the EIA concludes its empirical analysis that finds the market is not doing what it should, it restates the common faith in the marketplace:

However, trading in futures contracts provides benefits to market participants by providing some degree of price certainty, market transparency, and liquidity. In addition, trading in futures contracts is an important tool in an array of options for gas managers to consider in establishing their supply transaction portfolios. The availability of futures markets allows each gas manager to optimize his portfolio relative to his situation. As such, trading in futures contracts is expected to remain an important tool for managing price risk.¹⁷

Repeating the dogma, without further analysis, begs the question of whether the failure of markets to send sensible signals about prices undermines or diminishes their usefulness.

The LBL analysis takes the next step, because the authors are less concerned about whether the market price is “right” and more concerned about what market players do with the various predictions of price. Their concern was focused on the fact that electricity generators and public utility commissions were using the projected natural gas costs as a basis for making decisions about what types of generation to install. To the extent that the estimates of natural gas costs were no longer reliable predictors of natural gas prices (on the low side), gas generation facilities were being systematically and incorrectly favored at the expense of other sources of power. In this regard, the fact that there was a gap between mid and long-term projections of natural gas costs and market prices is itself important. Even if the gap could be “justified” on some systematic economic basis, it still argued for consumers (and their agents) to look at it differently in making their choices.

This review of the explanations suggests we really do not know a great deal about how natural gas markets work. It is a truism of commodity markets that the positions have to add up. For every buyer there has to be a seller and for every molecule that someone is committed to buy, someone has to be committed to sell. While this simple truism is frequently offered to support the claim that the market price is right and to allay fears that something is wrong, it actually explains nothing. The questions are who holds which positions, and with what systematic, strategic, tactical or nefarious tactics will they influence price?

Some of the explanations suggest that this is just “how the market works,” but that does not mean it is working very well from the consumer point of view, nor does it mean the situation is helpless. If these are systematic factors that tilt the playing field against consumers, policymakers can take steps to restore the balance.

Some of the explanations involve claims that the market is not working, because it is subject to strategic behavior, tactical exploitation and manipulation that drive prices up. Here, there is little doubt that we need public policy to set things straight.

The claim that markets are beneficial because they create liquidity is not an absolute statement. It must rest on empirical facts and conditions, several of which are important for natural gas consumers.

First, if the commodity and the institutional structures under which consumers (or their agents) buy gas in the market systematically place them at a disadvantage, the market will not work well for them. Their costs will rise, not because of the costs of the underlying commodity, but because of the workings of a hostile market. Second, the market may be vulnerable to manipulation. Third, the commodity market does not necessarily contribute to solutions to underlying physical problems.

If, in aggregate, natural gas producers are less concerned about hedging than are natural gas consumers, then there will be *negative net hedging pressure* – i.e. more hedgers seeking to buy futures contracts than there are seeking to sell them – and speculators will require compensation in the form of futures prices that are *above* expected spot prices.¹⁸

In terms of the quantity of gas traded, the finding was unclear. “Though largely positive over this period, net hedging pressure clearly swings around quite a bit, and is negative at times.”¹⁹ The finding in terms of the number of traders was quite different, which may compound the problem faced by consumers of natural gas.

In terms of the number of traders, net hedging pressures have been primarily *negative* over this period. This dynamic – largely positive net hedging pressure in terms of open interest combined with largely negative net hedging pressures in terms of the number of traders – suggests the presence of a few large natural gas producers, and a greater number of smaller (in aggregate) natural gas consumers, hedging their respective positions. It is not clear whether this implied market composition has any bearing on the premiums observed in ... this paper, an interesting question might be to examine either information asymmetry [or] transaction cost theory...

What if producers benefited from volatility, while consumers were hurt by it? In this case, producers would require compensation (i.e. a premium) for being locked into long-term fixed contracts and consumers would be willing to pay such compensation. Economic theory provides some support for this very scenario...

If gas prices, and therefore consumer expenditures on gas, rise as the stock market declines (e.g. because rising gas prices hurt the economy), then natural

gas is said to have a negative “beta” and is risky to gas consumers and beneficial to gas producers....

In this specific case, where gas with a negative beta is risky to consumers and beneficial to producers, consumers have an incentive to hedge natural gas price risk, while producers do not. Intuitively, it follows that even if both consumers and producers share identical expectations of future spot gas prices, then producers would still require – and consumers would be willing to pay – a premium over expected spot prices in order to lock in those prices today.²⁰

Each of these configurations cuts against the risk averse residential ratepayer. Moreover, the advantage of the large producers has been noted by market analysts. The large producers have greater flexibility to hold out for higher prices and take advantage of the direction of prices.

“[T]he E&P firms he covers are approximately 24% hedged for 2006 and only 10% hedged for 2007. Those levels are “pretty light” compared with several years ago when most were between 40% and 50% hedged.

“Obviously, we have concern about gas prices in the near term given the weather. It doesn’t surprise us that companies are locking in additional hedges,” Tameron [of Jeffries & Co.] said. Even so, most companies “are still making a lot of money at \$8/MMBtu and \$9/MMBtu.”²¹

The academic studies that suggest risk premiums and inefficient price discovery in these markets will strike a resonant chord with many market participants. Large users feel that this financial activity drives up prices and harms consumers.

Ted Henry, chairman and CEO of Selma, Ala.-based Henry Brick, said his company’s cost of gas last year “was 245% above the average of the 1990s.”

The volatility in the gas futures market makes it hard for industrial end-users to make bottom line decisions. “The traders need volatility. But it makes it difficult for us trying to use gas to produce a product.”²²

“Government data released today (June 2),” Mr. Huntsman’s statement said, show a record amount of natural gas in inventory for this time of year, and demand for gas remains flat. Yet in the last two trading sessions the price of gas on the NYMEX shot up more than 65 cents and closed up 44 cents. “On an annualized basis, that cost the U.S. economy between \$10 billion and \$15 billion.” Why? Because, according to one analyst, “fund buying jumped in... and sent prices racing...”²³

B. FUNDAMENTALS VERSUS TECHNICAL TRADING

A tangent of this debate is the difference of opinions between market analysts over the role of fundamentals versus technical trading. Choukas-Bradley and Donnelly argue that technical trading dominates and drives prices higher.

Trading of the natural gas contract on the NYMEX continues to be dominated by technical trading, with the result that in a period of stability in market fundamentals, the market will tend to see prices remain at high levels if they start at high levels, just as they would remain at moderate levels if they started at moderate levels. That is, part of what is propping up current prices is . . . current prices. While domestic producers have an incentive to hedge physical gas price exposure at prices equal to or above their full-cycle replacement cost (which includes their then-current competitive threshold return on invested capital), producers generally do not hedge a large portion of their production on a long-term basis, seeking, rather, to capture the upside of higher future prices. Speculative traders dealing with financial gas price exposure have the incentive to support price volatility and volume liquidity. Higher volatility has led to higher prices and a volatility penalty for gas-fired generation of electricity when compared to coal-fired generation (± 0.65 \$/MMBtu in 2004 dollars).

Other analysts go so far as to say that “an in-depth knowledge of fundamentals can be detrimental.”²⁴

While not discounting technical charts entirely, Fusaro said traders will have to be attuned to market fundamentals, such as weather and storage levels, to be successful in the new market.

But Tom Saal, of Miami-based Commercial Brokerage, countered that the funds' mere presence in the gas market is proof that chart-following does work because many of them rely exclusively on technicals...

In fact, since hedge funds have gained such a large presence in the futures market, Saal said it is even more important for gas traders to chart market behavior. While acknowledging that fundamentals were pushed aside over the past year in favor of technicals, he said it's the fundamentals that created the recent wave of volatility.

He said while technical charting didn't predict Katrina and the resulting surge in gas futures prices, neither did anyone or anything else.” Markets work of fear and greed, he argued. “And fear after Katrina that there would be problems this winter with the amount of gas shut-in – it's that fear and greed that created this huge price move.”

Cooper said he is skeptical that traders need more than technical charts to be effective in today's energy markets. "I would have said that, but the way the market has been behaving, I'm not sure. An in-depth knowledge of fundamentals could be detrimental."²⁵

While the analysts debate the relative importance of fundamental versus technicals, the traders scratch their heads at the behaviors they observe. They see little relationship between the movement of prices and either fundamentals or technicals.

Meanwhile, spot prices across the Northwest emerged mixed as mild weather across the region reduced power generation loads. Traders in the Rockies reported a quiet morning and appeared puzzled about why cash didn't fall farther. "There is no demand in the [Midcontinent], and utilities are turning gas away along the West Coast – I don't know who is buying, one Rockies trader said."²⁶

In the Northeast, prices fell as much as \$1.30 from Wednesday's midpoints "as loads continue to diminish," a trader in eastern Canada said. "Many traders are starting the [holiday] as well. They just came in, squared up and got out."

While further price erosion could occur today, the trader cautioned that the market might "offer a surprise" and rally. "You could see some short traders buy the market back up since there's a long weekend coming up and the contrast is closing early."²⁷

In the upper Midwest, "trading was all over the place with most points moving with the NYMEX strength early and never giving way," a regional trader said...

Some traders oversold early and had to buy gas back later in the session, which caused most Midcontinent points to strengthen late, a trader reported...

"You have to take a position early, either short or long, without really having to deliver anything," he said. "If you go long early you'll eventually have to buy back to get back in balance, to get to zeros. They were day-trading the thing."²⁸

Some traders attributed the rally to new National Weather Service forecasts calling for below-normal temperatures across much of the country during the second week of February. But others disagreed, citing bullish technical indicators as the primary market driver.

"We don't have any cold weather in the near term and, we're not going to run through our massive storage inventories," an analyst said. "We've just got a lot of shorts in the market looking to ring in at the cash register."²⁹

C. HYPE VERSUS REALITY

While some claim that the technical sides of the market should balance out, we have seen that there are forces that may favor upward pressures. Choukas-Bradley and Donnelly identify another force – hype.

Most of the news in the mainstream media will be bullish, all else being equal. This is because bad news makes news, whether it is characterized as corporate profiteering or consumer hardship, and good news for consumers is not interesting enough to be reported. From the consuming public's point of view, bullish price news is bad news. Probably nine out of ten stories in the mass media, all else being equal, will emphasize adverse consequences for average people (e.g., "the coming crisis in natural gas prices"). By contrast, in the producer community such "bad news" is good news, of course. That is, bullish news concerning higher natural gas prices or greater consumer demand is welcome news. This underscores the paradox of the media marketplace in the natural gas industry. The trade press is dominated by the interests of producers, with a bias in favor of higher prices that can support development of incremental supply for growth in consumer demand. The trade press reports and responds to the pronouncements and projections of stock analysts who cover the industry. These individuals write reports about the companies they follow, and they implicitly consider the interest of their industry to reside in higher prices. On the other hand, the mass media pick up pronouncements of high prices as news not because they see it as good news, but for precisely the opposite reason. It is bad news for consumers, and is therefore something worth reporting. Neither the producer-oriented media nor the consumer-oriented media are served institutionally by bearish natural gas price news. Accordingly, bearish news or trends must fight for a place at the media "table," or will not get a seat. Bullish news, on the other hand, will always be given a seat.³⁰

Large industrial users reiterate this feeling.

"The only ones who prosper are finance markets and traders that do not produce, transport, or consume natural gas." [Huntsman] alleged that one of the country's largest financial institutions (which he declined to identify) had touted as "good news" new forecasts of a worse-than-normal hurricane season and the possibility of decreasing gas imports, would be excuses to force up prices. "It makes absolutely no sense."³¹

Traders give these types of explanations when prices seem to be higher than seems justified by either fundamentals or technical factors. "They tried to hype the snow a bit at first, but realistically it's not going to have a very big impact on overall storage draws."³²

In the Northeast, spot prices gained between 15 cents and 60 cents due to a mixture of “fear, trepidation and greed – but not fundamentals,” according to one eastern Canadian trader.³³

“You got a little upward momentum from the tropical storm activity, but it’s probably not causing this much by itself,” said a Houston-based broker.

“There’s been some short-covering initially that people are concerned about the storm and oft-times that triggers a lot of fund buying, particularly in this price range.”

In the cash market, traders also turned their attention to Wilma, which added to an already bullish sentiment. “It’s still a non-event, and the models I’ve seen show it staying away from rigs in the Gulf,” a trader said. “Traders will still talk their position, though, and that’s why we’re seeing some price movement.”³⁴

D. OTHER SOURCES OF INEFFICIENCY

This analysis has focused on the physical and financial markets. The inflexibility of transportation and storage play a key role in creating a vulnerable commodity. There are additional factors at play between the wellhead and the burner tip that undermine the ability of the system to operate efficiently. These deserve consideration as well.

1. Utilities

Institutional factors can play a role as well, by biasing behavior.³⁵ In natural gas markets, the problem is important because many utilities, who are the purchasing agents for residential ratepayers, do not have a strong incentive to keep costs down, since they are passed through in a monopoly situation. Fearing that regulators might disallow expenses if they play the market, they reduce their own risk by simply tying the cost of acquiring gas to published indexes. Many of the indices are based on voluntary, unaudited reports of traders. Ironically, those reports are based on prices set in transactions in which the utilities themselves never engage.

State regulators have been hesitant to encourage risk-taking behavior by utilities because overseeing such activity is not their expertise and ultimately (residential) consumers are risk averse. Early in the development of natural gas markets, short-term purchases looked better. Now, longer terms would be more prudent, but they are simply not available. Although facilities last for decades and demand is growing slowly, at most, NYMEX’s six-year futures contracts are sparsely traded. Out past a year, markets are thin. Even mid-term contracts are costly and risky, if they can be had at all.

Buyers of natural gas are regulated distribution companies and electric power generators. They are either prohibited from entering natural gas futures

contracts by their state regulatory commissions or otherwise have dulled incentives to do so. One reason for this conjecture is that they can pass their gas procurement costs to their retail customers through prudence reviews. The second reason is that these regulated companies do not want to be subject to second-guessing by stakeholders. The seasonal pattern of consumption could also be another reason for the observed results.³⁶

Theoretically, if a utility buys everything on a spot market, that's sensible from a utilities point of view. They want to avoid the regulatory risk... But it's probably not sensible for their consumers [to bear] all the risk of price volatility for gas and power."³⁷

There is a general consensus that utilities are not in the markets as hedgers, although a small number are. Moreover, there is a belief that hedging has declined, as volatility and large financial players have moved into the market.

"Most utilities have stopped hedging and instead rely on the fuel-adjustment clause that allows them to pass on to consumers... Many utilities exited trading, Duke being the last one. The point is they are not really in the game except for Constellation, Sempra, Dominion and a few others. That more customers are exposed to price risk because they are passing on the higher costs to customers."³⁸

Cooper said many utilities probably have stopped hedging in such a risky environment because they have to eat their losses if they miscalculate. "Utilities are not in the business of predicting prices," he said. "They don't care what the price is. They pass it on to customers."³⁹

While the institutional context in which utilities function certainly restricts their inclination to play in the financial market, as volatility and prices mount, it becomes more burdensome for all users. The cost of hedging becomes higher and higher.

But with gas above \$10/mmBtu and futures market direction unpredictable, even hedging and other risk management tools are becoming more and more expensive – raising the question of whether the benefit is worth the cost...

For example, Invista uses financial derivatives, collars and similar tools to hedge against current market conditions. But gas at \$10/mmBtu or higher and unprecedented volatility "makes all of these actions a little more costly," Poole noted. "It raises the question: is the elimination of price volatility worth the cost?"

And while Invista has the money and in-house expertise to handle risk management activities internally rather than farming them out to marketers or

energy service companies, “unfortunately, for smaller-volume companies that may not be a feasible option.”⁴⁰

Tying prices to indices is the ultimate short-term strategy. This institutional view raises concerns because the capital-intensive infrastructure of the industry has historically been financed by long term contracts. The deregulation and unbundling of the industry inevitably shortened the time horizon of the participant. Flexibility and choice loosens commitments and makes “bypass” possible. Pipelines cannot count on shippers as much as in the past. Utilities cannot count on load as much as in the past. Merchants demand faster recovery of costs.

In fact, a major impetus for restructuring of the natural gas industry was the high social cost associated with rigid long-term contractual arrangements...

With the natural-gas sector restructuring... trading arrangements have become much more short term and flexible in both price and in terms and conditions. We have observed this phenomenon throughout the natural-gas sector, from gas procurement, gas storage, and retail transactions, to capacity contracting for pipeline services.⁴¹

Long term commitments to transportation and storage facilities, exposes the contracting parties to greater risk in this environment, especially where long term commitments to supply cannot be secured. The mismatch between the incentive structure and the necessary time horizon results in missed opportunities. For example,

Jack Flautt, Managing Director of March & McLean, suggested there is an anomaly in the storage investment area. It is strange, in his view, that investors are not trampling one another to participate in the storage development market. “The value of storage today is greater than at any time in my lifetime,” but Flautt reported he gets only blank stares from bankers at the suggestion.⁴²

The hesitance of public utility commissions to push utilities to jump back in to long-term commitments is understandable and the task of realigning risks is challenging.⁴³

2. Gathering System Market Power

First, with the deregulation of the national markets, oversight over the gathering systems was passed to the states. There is an ongoing dispute over the abuse of market power in these markets. A recent proceeding in Texas provides insight into this issue.

The key issue is the large price wedge that gathering systems can drive between the wellhead price and the Henry Hub price.

Producers claim that a lack of pipeline competition has hurt their industry, particularly the smaller operators that frequently have access to only a single

intrastate system and must therefore accept whatever transportation rates the pipeline charges...

“One-sided negotiations over time has become more and more onerous toward producers, and the overwhelming market power of the monopolistic pipelines has reduced the wellhead value of natural gas by over 50% in many cases,” said Mills, whose association presents mostly small independent operators. “When Houston ship channel is [\$6/MMBtu], the guy out there taking the risk drilling wells and completing wells in a lot of cases is going to get less than \$3.”⁴⁴

The size of the producers plays a key role. While large players may have sufficient bargaining power to blunt the market power of the pipelines, small players do not.

Producers large and small asserted that they have been subjected to abusive market practices due to a lack of pipeline competition, while end-users complained of poor gas quality...

David Blakmon, manager of corporate affairs for Houston-based Burlington Resources, said independent producers – which drill 85% of new wells in the state [Texas] – often are forced to enter into that contracts that contain take-it-or-leave-it provision... “Burlington is a big enough company that we make sure we have a market position that allows us to negotiate favorable agreements.”

Don Holley, president of Brenham, Texas-based Holley Oil, represented small operators at the workshop. “Three times in the last 18 months I’ve been presented with a ‘take it or shut in your well contract,’” he complained. “We should not be placed in the position of having to take-or-leave contracts.”

A new contract negotiated in January increased the transportation cost of his production by 200% per MCF, Holley said, widening the difference between his production at the wellhead and the Henry Hub index price to \$4/Mcf.⁴⁵

Beyond the issue of price, the producers face the problem of being unable to find information on rates, terms and conditions.

The procedure does not provide “the information that the producer needs to access to make a decision” about the actual cost of the gas transportation service the pipeline provides. For example, a producer does not know what rates the pipeline is charging a competitor for the same service.

“They don’t know what the actual terms of the cost of service are as a whole... The transparency of information is not existent. We don’t know it. They do. It gives them a huge leg up in terms of negotiating the price.”⁴⁶

The intrastate pipelines have attempted “to keep as much information secret and out of producers hands as much as possible.” Mills charged. He said the pipelines often use index prices, which are not transparent to smaller producers, as benchmarks for their shipping contracts.

In addition, he said, “the tariffs that the pipelines have to post are all in code. It’s virtually impossible to find the price from Point A to point B of a tariff.”⁴⁷

E. WHAT IT TAKES TO MOVE MARKETS

The discussion of the financial commodity markets has identified the key moments and issues and actors in the physical market. The major petroleum companies have been identified as big players in the financial commodity markets. They have been dinged for trading that breaks the rules in these markets. They are also the dominant firms in the physical market. Thus, they are in unique a position to move the market as traders and speculators in the short term and producers in the long term.

The previous sections provide an account of the history of trading in natural gas. Prior to the Commodity Futures Modernization Act, manipulation of cash settlements was a more theoretical concern because the indices were broad and the positions needed to move them were huge. The CFMA allows narrow indices, which raises concern because the necessary conditions for moving the price are smaller. Other factors that can narrow the necessary position compound the problem. Friction in the physical markets, and illiquidity in the financial markets, makes it easier to move markets.

Factors that facilitate the ability to move the market with smaller positions may play a part as well and are in evidence in the natural gas market. For example, the fact that entities bring huge sums to bear with very sophisticated tools enhances their ability to move the market. Above all, the tightness in a market with very low elasticities magnifies the ability of small changes in supply to move price.

The fact that we have seen actual examples of this price manipulation repeatedly, across all energy commodities, should make it clear that prices can be moved. But the recent reaction to the hurricanes underscores how little it takes.

The loss of production from the hurricanes was quite small. The actual physical loss of production was probably never much greater than 5 percent of national supply at its height, but a substantial part of that loss was offset by demand destruction in the Gulf Coast region. The shortfall in gas for the market was probably in the range of 3 to 5 percent and some estimates of year-over-year comparisons show only a 2 percent reduction. Most analysts agree that even that was partially offset by mild weather and fuel switching.

Even at a 3-5 percent shortfall, the price reaction was extreme. With spot prices supporting a sustained rise of 75 percent, the elasticity would appear to be in the vicinity of

.05. With wellhead prices registering an increase of 50%, that suggests an elasticity of less than 0.1. Stated in traditional terms, a one percent reduction in supply yields a 15 to 20 percent increase in price.

For the obvious reason that the over-the-counter market is unregulated, we do not know how large the positions of the hedge funds are. We would especially like to have this information for key moments, such as during the settlement period. We do have information on the size of the marketers. These would be the entities on the selling side of the market when molecules actually change hands.

BP, the largest marketer prior to Katrina, had a market share of over 20 percent. The next three firms have market shares of about ten percent. Another six firms have market shares in the 3 to 5 percent range. Among these ten firms are four major oil companies and two major utilities. Given the extremely low elasticities of supply and demand and the extremely reactions of the market to relatively small changes in the supply demand balance, careful consideration of the market shares necessary to exercise market power may be in order for the natural gas market.⁴⁸

When entities have ownership of the resources and take large positions in the physical, cash and futures markets, they gain leverage. Purely financial players face a key constraint in long manipulation – the problem of disposing of the excess supply. If you are a trader, who has accumulated a large long position, in time or space, you must dispose of those positions at some point, without driving down prices and erasing your gains.

Transport costs make it optimal to retain some of the additional units delivered... rather than return them to the market of origin. These additional supplies depress the price. Market slang refers to this as the problem of *burying the body* or *disposing of the corpse*... Intuitively, the manipulator exploits his market power by restricting the number of liquidations in order to elevate the liquidation price. Nonetheless, in order to profit he must liquidate some contracts. If he were to take delivery on his entire position, he would suffer a loss due to the bury-the-body effect. As a result, he takes delivery on only a part of it.⁴⁹

If you are the physical owner of a commodity like natural gas, you do not have to bury the body, you can just leave it in the ground. You do not have to make purchases that later have to be buried. Large producers, flush with cash and not facing competitive market discipline, hold out for an ever-escalating market price. Consumers, in need of physical supplies, pay an increasing premium.

F. CONCLUSION

The impact of an aberrant market is substantial, producing many of the characteristics that the natural gas market seems to exhibit.

Precontract-expiration prices vary idiosyncratically with trading volume...
reduces market liquidity and depth and increases price volatility...

makes the cash-futures basis excessively variable, thereby reducing the hedge performance of a futures contract...

increase the costs and risks that informed traders incur and reduces the returns to discovering information about fundamental values...

induces these agents to trade less and collect less information...

As a result, the futures price is a less reliable measure of fundamental supply and demand.⁵⁰

Defenders of the financial markets want to blame the whole problem on the physical markets and even claim that traders will help solve the problem by increasing liquidity and sending price signals. But the evidence suggests that the financial commodity market bears at least some of the blame for pushing prices up.

- We have a commodity that is vulnerable to abuse, in a new market that has been under-regulated from its birth.
- Public policy adopted in 2000 further reduced regulation and opened the door to counterproductive, if not outright manipulative, behaviors and pushed prices higher.
- We have a clear theory about how consumers could be hurt in this market.
- Both the structure of the market and the behaviors of market players are biased in favor of higher prices and against consumers.
- We have evidence at the micro levels of a pervasive pattern of past abuses and rumors about suspicious behavior in the current market.

The overall pattern of prices supports the proposition that they have run up beyond anything that is justified by the problems in the physical market. Exhibit I-2 above summarizes the cost v. price analysis presented in previous chapters. A huge wedge has been driven between the costs of production and the futures market prices. The stakes are immense, on the order of \$300 billion dollars over the course of half a decade.

ENDNOTES

- ¹ Robert S. Pyndyck, "Volatility in Natural Gas and Oil Markets," *Journal of Energy and Development*, 30:2004, finds statistically significant increasing volatility in natural gas through mid-2002, but dismisses it as economically insignificant.
- ² Id., p. 3.
- ³ The impact of Enron's collapse is complex, with a loss of efficiency (Donald Murray and Zhen Zhu, "EnronOnline and Informational Efficiency in the U.S. Natural Gas Market," *The Energy Journal*, 25: 2004; Pyndyck, "Volatility."
- ⁴ Song Zan, Chiou Wei, and Zhen Zhu, "Commodity Convenience Yield and Risk Premium Determination: The Case of the U.S. Natural Gas Market," *Energy Economics*, forthcoming.
- ⁵ Nahid Movassagh and Bagher Modjtahedi, "Bias and Backwardation in Natural Gas Futures Prices," *The Journal of Futures Markets*, 25: 2005, p. 306.
- ⁶ Bagher Modjtahedi and Nahid Movassagh, "Natural Gas Futures: Bias, Predictive Performance and the Theory of Storage," *Energy Economics*, 27: 2005, p. 635.
- ⁷ Modjtahedi and Movassagh, "Bias," p. 635.
- ⁸ Id. p. 635. W.K. Bucanon, P. Hodeges and J. Thied, "Which Way the Natural Gas Price: An Attempt to predict the Direction of Natural Gas Spot Price Movements Using Trader Positions," *Energy Economics*, 23: 2001, p. 285, find hedgers short and speculators long.
- ⁹ Indeed, "because of their relatively short time to expiration (1< month in the case of natural gas), first-nearby future prices (sometimes referred to as "prompt-month" or "spot month" prices) are a close approximation of spot prices.
- ¹⁰ *An Assessment of Prices of Natural Gas Futures Contracts as a Predictor of Realized Spot Prices at the Henry Hub*, p. 6.
- ¹¹ *An Assessment of Prices of Natural Gas Futures Contracts as a Predictor of Realized Spot Prices at the Henry Hub*, p. 6.
- ¹² *Platts Gas Daily*, September 30, 2005, p. 8
- ¹³ Bolinger, Mark and Ryan Wiser, *Comparison of AE O2006 Natural Gas Price Forecast to NYMEX Futures Prices* (Ernest Orlando Lawrence Berkeley Laboratory, December 19, 2005).
- ¹⁴ Bolinger and Wiser, "Comparison," p. 1.
- ¹⁵ Bolinger, Mark and Ryan Wiser, and William Golove, *Accounting for Fuel Price Risk: Using Forward Natural Gas Prices Instead of Gas Price Forecasts to Compare Renewable to Natural Gas-Fired* (Ernest Orlando Lawrence Berkeley National Laboratory, August 2003), p. vii.
- ¹⁶ Bolinger and Wiser, "Comparison," p. 1.
- ¹⁷ EIA, p. 6
- ¹⁸ Bolinger, Wiser and Golove, "Accounting," p. 42.
- ¹⁹ Bolinger, Wiser and Golove, "Accounting," p. 44.
- ²⁰ Bolinger, Wiser and Golove, "Accounting," pp. 44-45.
- ²¹ *Platts Gas Daily*, February 13, p. 6.
- ²² *Platts Gas Daily*, Feb. 7, 2006, p. 7.
- ²³ Foster Report, No. 2544, June 9, 2005, p. 21
- ²⁴ *Platts Gas Daily*, January 3, 2006, p. 4.
- ²⁵ *Platts Gas Daily*, January 3, 2006, p. 4.
- ²⁶ *Platts Gas Daily*, Sept. 13, 2005, p. 2.
- ²⁷ *Platts Gas Daily*, December 23, 2005, p. 2.
- ²⁸ *Platts Gas Daily*, Jan. 30, 2006, p. 2.
- ²⁹ *Platts Gas Daily*, Jan. 31, 2006, p. 2.
- ³⁰ Choukas-Bradley and Donnelly, pp. 2-3.
- ³¹ Foster Report, No. 2544, June 9, 2005, p. 21
- ³² *Platts Gas Daily*, Feb. 14, 2005, p. 2.
- ³³ *Platts Gas Daily*, Aug. 31, 2005, p. 2.

- ³⁴ Platts *Gas Daily*, October 18, 2005.
- ³⁵ Pirrong uses pension and mutual funds as an example. "They are unable to trade certain types of instruments, which are lower cost ways of liquidating contracts. "The incur transaction costs to do so. Moreover, the funds tend to follow *buy and hold* strategies... in order to meet cash flow management objectives. This suggests that they incur high explicit or implicit costs to trade their portfolios."
- ³⁶ Movassagh and Modjtahedi, 2005, p. 306.
- ³⁷ Platts, *Gas Daily*, Jan 4, 2006, p. 4.
- ³⁸ Platts *Gas Daily*, January 3, 2006, p. 4
- ³⁹ Platts *Gas Daily*, January 3, 2006, p. 4.
- ⁴⁰ Platts, *Gas Daily*, September 12, 2005, p. 1Y 4.
- ⁴¹ Costello, Ken. "Are Regulators in for the Long Haul?," *Public Utilities Fortnightly*, July, 2005, p. 48.
- ⁴² *Foster Report No. 2576*, January 27, 2006, p. 16.
- ⁴³ Several recent studies point to a complex package of policies need to accomplish this (see for example, INGAA foundation, Inc., *Discussion of Effects of Long-Term Gas Commodity Contracts on the Development of North American Natural Gas Infrastructure*, prepared by Energy and Environment Analysis, Inc., 2005) and recognize that case-by-case decisions based on fact intensive analysis is needed, rather sweeping recommendations are inappropriate (see for example, NARUC/IOGCC Joint Task Force, *Policy Recommendations for Long-Term Contracting for Natural Gas Transportation, Storage Services and Liquefied Natural Gas Deliver*, October 2005).
- ⁴⁴ Platts *Gas Daily*, November 28, 2005, p. 5.
- ⁴⁵ Platts *Gas Daily*, December 7, 2005, p. 4.
- ⁴⁶ Platts *Gas Daily*, November 29, 2005, p. 4.
- ⁴⁷ Platts *Gas Daily*, November 28, 2005, p. 5.
- ⁴⁸ This debate is taking place with respect to the oil industry (see Cooper, Mark. *Record Prices, Record Oil Company Profits: The Failure Of Antitrust Enforcement To Protect American Energy Consumers*, Antitrust Section, American Bar Association, April 1, 2005) and electricity ("Recognizing the Limits of Markets, Rediscovering Public Interest in Utilities," in Robert E. Willett (ed), Electric and Natural Gas Business: Understanding It! (2003 and Beyond) (Houston: Financial Communications: 2003), as well as natural gas ("Too Much Deregulation or Not Enough," *Natural Gas and Electricity*, June 2005; "Real Energy Crisis is \$200 Billion Natural Gas Price Increase," *Natural Gas and Electricity*, August 2004).
- ⁴⁹ Pirrong, 33... 34
- ⁵⁰ Pirrong, p. 12